

CLAIMS

What is claimed is:

1. A computer implemented speech recognition method for performing Natural Language Understanding (NLU) functions, comprising the steps of:
 - (a) converting a user utterance into a plurality of basic speech units, said user utterance being a sequence of words expressing a query or a command;
 - (b) matching said plurality of basic speech units against a plurality of combinations of items, wherein each item is tagged data or is a concept code; and
 - (c) generating a combination of items likely to be representative of said user utterance.
2. The method of claim 1, said step (b) further comprising:
 - (d) a first step of matching said plurality of basic speech units against a vocabulary of items to generate a first list of items likely to be representative of said user utterance.
3. The method of claim 2, wherein said step (d) is performed using Hidden Markov Models.
4. The method of claim 2, said step (b) further comprising:
 - (e) a second step of matching said first list of items against said plurality of combinations of items to generate said combination of items likely to be representative of said user utterance in said step (c).
5. The method of claim 4, wherein said step (e) is processed using a conceptual language model.

- 1 6. The method of claim 5, wherein said conceptual language model is an n-gram
2 conceptual language model.
- 1 7. The method of claim 6, further comprising an initial step of training said
2 conceptual language model.
- 1 8. The method of claim 4, wherein said step (c) is processed using a conceptual
2 grammar.
- 1 9. The method of claim 2, further comprising:
2 a training step defining said vocabulary of items of said step (d).
- 1 10. The method of claim 1, further comprising:
2 defining said plurality of combinations of items of said step (c) in a training step.
- 1 11. The method of claim 9, further comprising:
2 defining said plurality of combinations of items of said step (c) in a training step.
- 1 12. The method of claim 1, further comprising:
2 storing a set of prototype acoustic models obtained from a training phase,
3 wherein each said acoustic model represents one or more possible basic speech units
4 of an utterance of a word.
- 1 13. The method of claim 12, further comprising:
2 assigning one of said acoustic models to each said basic speech unit.
- 1 14. The method of claim 1, wherein said user utterance is in the form of isolated
2 data.

1 15. The method of claim 1, wherein said tagged data includes two consecutive
2 words.

1 16. The method of claim 1, further comprising:
2 sending said most likely combination of items to a function identification module
3 to perform said user query or command.

1 17. A speech recognition system for performing Natural Language Understanding,
2 said system comprising:
3 (a) a converter, said converter converting a user utterance into a plurality of
4 basic speech units, said user utterance being a sequence of words expressing a query
5 or a command;
6 (b) a processor, said processor matching said plurality of basic speech units
7 against a plurality of combinations of items, wherein each item is tagged data or is a
8 concept code; and
9 (c) a generator, said generator generating a combination of items likely to be
10 representative of said user utterance.

1 18. A speech recognition system for performing Natural Language Understanding,
2 said system comprising:
3 an acoustic processor, said acoustic processor for receiving a user spoken
4 utterance and determining a string of labels identifying a corresponding sound of said
5 user spoken utterance;
6 a decoder communicatively linked to said acoustic processor, said decoder
7 determining a likely sequence of items corresponding to said determined string of
8 labels;
9 a conceptual pronunciation dictionary providing said decoder with a
10 pronunciation of said items;

11 a conceptual syntax module providing said decoder with a set of allowable
12 combined items; and

13 a target function identification module communicatively linked to said decoder,
14 said target function identification module executing a function corresponding to said
15 likely sequence of items.

1 19. The system of claim 18, wherein said decoder comprises a fast acoustic match
2 and a detailed acoustic match.

1 20. The system of claim 18, wherein said conceptual syntax module comprises a
2 conceptual language model or a conceptual grammar.

1 21. A machine-readable storage, having stored thereon a computer program having
2 a plurality of code sections executable by a machine for causing the machine to
3 perform the steps of:

4 (a) converting a user utterance into a plurality of basic speech units, said user
5 utterance being a sequence of words expressing a query or a command;

6 (b) matching said plurality of basic speech units against a plurality of
7 combinations of items, wherein each item is tagged data or is a concept code; and

8 (c) generating a combination of items likely to be representative of said user
9 utterance.

1 22. The machine-readable storage of claim 21, said step (b) further comprising:

2 (d) a first step of matching said plurality of basic speech units against a
3 vocabulary of items to generate a first list of items likely to be representative of said
4 user utterance.

1 23. The machine-readable storage of claim 22, wherein said step (d) is performed
2 using Hidden Markov Models.

1 24. The machine-readable storage of claim 22, said step (b) further comprising:
2 (e) a second step of matching said first list of items against said plurality of
3 combinations of items to generate said combination of items likely to be representative
4 of said user utterance in said step (c).

1 25. The machine-readable storage of claim 24, wherein said step (e) is processed
2 using a conceptual language model.

1 26. The machine-readable storage of claim 25, wherein said conceptual language
2 model is an n-gram conceptual language model.

1 27. The machine-readable storage of claim 26, further comprising an initial step of
2 training said conceptual language model.

1 28. The machine-readable storage of claim 24, wherein said step (c) is processed
2 using a conceptual grammar.

1 29. The machine-readable storage of claim 22, further comprising:
2 a training step defining said vocabulary of items of said step (d).

1 30. The machine-readable storage of claim 21, further comprising:
2 defining said plurality of combinations of items of said step (c) in a training step.

1 31. The machine-readable storage of claim 29, further comprising:
2 defining said plurality of combinations of items of said step (c) in a training step.

1 32. The machine-readable storage of claim 21, further comprising:
2 storing a set of prototype acoustic models obtained from a training phase,
3 wherein each said acoustic model represents one or more possible basic speech units
4 of an utterance of a word.

1 33. The machine-readable storage of claim 32, further comprising:
2 assigning one of said acoustic models to each said basic speech unit.

1 34. The machine-readable storage of claim 21, wherein said user utterance is in the
2 form of isolated data.

1 35. The machine-readable storage of claim 21, wherein said tagged data includes
2 two consecutive words.

1 36. The machine-readable storage of claim 21, further comprising:
2 sending said most likely combination of items to a function identification module
3 to perform said user query or command.